Invited Talk - C

Transforming the libraries to adapt global changes through smart libray system

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Abstract

Libraries are considered as growing organisms, and managing changes is one of the essential roles of librarians. The purpose of this paper is to explore how to transform the traditional libraries, which are continuously pervaded by varying and widespread global changes brought by many factors, coupled with the ever-changing and expanding user demands and expectations. Changing factors are identified mainly by evolving technologies, changes in the scholarly publishing ecosystem, COVID-19 pandemic, political and economic crisis, civil unrest, and Sustainable Development Goals. This study recommends that librarians must be 'change champions' and develop the library system as smart libraries.

Keywords: *Smart library, Scholarly publishing, Sustainable development goals, Change management, COVID-19 pandemic, Maker space*

Introduction

Libraries of all sectors currently experience many challenges in facing perceived new needs and expectations of library patrons due to global changes in various perspectives. As Ranganathan's fifth Law, "Library is a growing organism". This means libraries should be dynamic in nature to incorporate and face any types of changes and to adapt to new technology. Ranganathan perceives the library as a dynamic organisation in a frequently changing environment. Accordingly, the institute should change and adapt itself to the spirit of time so that it can serve the best of those who need it. Change is inevitable, whether it is personal, work-related or regarding the ecosystem. Change might be a systematic, natural process, and some changes may

be uncertain or unprecedented. Managing changes is essential to any organisation, including libraries. The objective of change management is "not to sell the solution, but to sell the problem while offering staff a partnership in creating the answer, and only then laying some alternatives on the table." (Pugh, 2007 in Knight 2017). This author emphasised that past practices, managing system and services as it is, will not create and sustain successful libraries. Kotter (2007 In Knight 2017) stated, "change by definition, creating a new system." Change champions can prompt new systems of managing libraries once they recognise and act upon the need for a paradigm shift. Change champions ensure that their respective libraries are in a position to adapt to societal needs, especially those of the millennials.

Any organisation must be prepared to face the changing world. Many scholars defined 'readiness to change' in different perspectives under change management. We have to understand this phenomenon of readiness to change.

We will consider the straightforward definition Musslewhite and Ploutte (2010) gives for readiness to change. They defined readiness to change as "the ability to continuously initiate and respond to change in ways that create advantage, minimise risk and sustain performance". Libraries must adapt to such changes and transform their collections, services, daily routines and performances to cope with the global changes.

Global changes in the sense could be treated from different perspectives as follows.

1. Revolutionary changes brought by the technology
2. Changes due to paradigm shift in the scholarly publishing ecosystem
3. Changes due to environmental pollution, climate change, greenhouse effect, global warming etc.
4. Changes due to pandemics such as SARS, COVID-19, etc.
5. Changes in the economic and political arena and due to civil war
6. Changes are anticipated and expected by human beings purposefully through sustainable development goals.

The above changes may not occur simultaneously. Anyhow, a few changes may be parallel to each other; especially the changes brought by the technology are parallel to other changes in most occurrences, as technology s ever evolving. Therefore, changes brought by the technology must be considered carefully, which will help minimise risks brought by other changes. "Libraries are innovating a variety of

services and spaces to meet the changing needs and demands of the times, but above all, they are constantly pursuing bold challenges and various transformations to change the existing stereotypes and perceptions that users have towards libraries", Noh, (2020). Libraries must identify such bold challenges, glass ceilings and stereotypes to develop.

With the development of technology, we observe paradigm shifts in almost all the activities of libraries. Therefore, we will see how the libraries should be prepared to transform themselves for every change stated above.

Scholarly publishing ecosystem

Wijetunge (2021) described scholarly publishing as "publishing related to the academic disciplines, written by the scholars of that discipline and reviewed by their peers before getting published". Scholarly publishing contributes to scholarships, and scholars publish their research findings in any scholarly outlet in order to disseminate new knowledge and to take part in scientific communication forums of their respective disciplines

Saarti and Tuominen (2021) mentioned that 'advancements in technologies and social practices have led to a paradigm change in scholarly publishing and knowledge dissemination".

The conventional scholarly publishing ecosystem changes to an electronic publishing system. Library resources are replaced monographs, printed books and journals with e-books, e-journals and e-database. Open Access shifts business models of subscribing to journals through big deals and purchasing articles through toll access. As the format of scholarly publishing outlets changes with developing technology, library activities and services related to scholarly materials such as acquisitions, cataloguing, and circulation and archiving have also changed.

Pandemic and libraries

Unpredictable or unprecedented forces of change, for instance, pandemics, affect the libraries' day-to-day activities and mode of service delivery. During the pandemic and post-pandemic periods, the situations have transformed the way we already provided services. Continuous lockdowns, closure of libraries, social distancing, quarantine, restricted access to circulation services of print materials, and stopping

contagion are a few global challenges the libraries too encountered. Apart from the usual library services for teaching, learning and research needs, librarians were in a critical position to provide valuable, accurate and truthful information to the population regarding the COVID- is issues. Librarians were responsible for mitigating the spread of false or manipulated information (Infodemic), which hurts society. Is it possible to resist changes? What are our strategic directions?

Libraries sustained to provide virtual library and information services during the lockdown. Subsequently, even during the new normalcy situation, remote access to scholarly databases, e-books, access repository, e-theses, online past question papers and subject gateways. User education is conducted through ZOOM webinars. Virtual teaching of information literacy for undergraduates and postgraduate students is continued through an e-learning system. Furthermore, libraries provide scholarly communication support services to university researchers through assistance in literature search and delivering articles. New normal has changed the nature of library routines and services.

However, libraries must face perceived new needs and expectations brought by the local or global changes in the future.

- Have we reinvented our strategic plans?
- Have we shifted to incorporating innovative services?
- Did we facilitate access to e-resources & open educational resources for the teaching, learning and research needs of our patrons?
- Are we ready to perceive changes in the future?

Ortega-Martínez, E.A., Pacheco-Mendoza, J.P. & Meléndez, H.E.G. (2021) emphasised developing quality remote library systems to face changes brought by such pandemics in the future.

Sustainable Development Goals (SDGs)

Policymakers and governance wish to change the world to a new paradigm. In this aspect, 'Transforming the world in 2030' is the United Nation's agenda for sustainable development. Access to information is an essential requirement to achieve all 17 SDGs, (Mashroofa, 2022).

Librarians have to ensure sustainable library and information Services. IFLA (2021) has developed and launched a toolkit which aims "support advocacy for the inclusion of libraries and access to information in formal national and regional development plans adopted in the context of the SDGs". This IFLA's advocacy has included three significant aspects; support to libraries at the regional, national and local levels, direct engagement at the global level, and tools and materials to help libraries use the SDGs as a framework. IFLA's Library Map of the World is an excellent indicator to make the world visible on the extent of SDG activities they engage. This map uses library visits as an indicator. IFLA participates in the "High- level political forum", of the UN. IFLA encourages all libraries to participate similarly in their respective government's initiatives and developmental activities. Libraries across the globe could formulate plans to integrate the SDGs into all their programmes and projects.

Climate change and libraries

Climate change is a common problem experienced by almost all countries around the globe. In addition, libraries face natural disasters such as floods, droughts, hurricanes etc. Libraries should be prepared for such disasters. What options safeguard the library collections and services in such situations? Are we practising any disaster management strategies? Cloud computing, the Internet of Things, digitisation, digital archiving, metadata development, and database management are a few strategies.

Another vital aspect of preventing global warming is introducing green libraries. These strategies will be supportive in achieving SDGs 6,7,13, 14 & 15.

Civil unrest/ economic/political crisis

Sri Lanka is currently experiencing challenges due to economic and political crises and civil unrest. This also causes the closure of libraries, as we experienced during a pandemic. Libraries are in a position to satisfy user demands virtually and facilitate access to library resources remotely, teaching information literacy by using a virtual learning system or e-learning system. Due to financial shortfalls, librarians face enormous difficulties in developing collections, especially acquiring the required textbooks, recommended readings and subscribing to journals. Due to inflation, they have to pay two or three folded amounts to purchase a specific item from overseas. Collaborating with libraries across the globe, consortium subscription, and open access resources could be a few strategies to help the librarians meet the required materials.

Libraries may operate in racist societies; such frameworks of systematic racism, oppression, supremacy and many more might negatively affect such libraries. Therefore, librarians must be very smart in addressing diversity, inclusion and social justice issues, which could support achieving SDGs. Collections and services should be fair to all communities, especially to underrepresented and marginalised communities.

SDG16 is 'promote peaceful and inclusive societies for sustainable development, provide access to justice for all. To achieve this goal, libraries, especially public libraries can work. This is because libraries are a beacon to diversity and inclusion, and librarians are considered community servants.

Complex cultural space (CCS) is a concept that recently flourished in western countries, especially in Europe, the UK, the USA, etc. This complex cultural space effectively combines two or more facilities for unique functions in a single building/ site to maximise space efficiency. This may be a maker space or hackerspace, but revitalising libraries is essential. The term culture shows that this space should connect culture, cultural products/ creators and helps to enjoy the culture. CCS includes space for education/ learning, information space, exhibition space, performance space, community space, rest area, lifelong learning centre, open and creative space, This facilitates Arts creation activities and sociability, improving local culture and provides support that can create a new culture while offering places to experience and appreciate the culture.

Advanced technology such as smart appliances, voice-controlled assistants, application of robots in performance, etc. is a few other applications that were introduced through adopting advanced technology.

Adapting advanced technology

Technology has continued to evolve since the emergence of the invention of computers. The development of Information and Communication Technology (ICT) has influenced the way we manage our lives. Most educational institutions integrate such technology in teaching, learning and managerial activities. So is there any chance that libraries are managed? Yes really.

Libraries shift to the automated library management system, and the catalogues are publicly made available through Online Public Access Catalogue (OPAC). Manual

routines, services and communications are performed through digital services. Traditional document delivery mode is converted to e-document delivery, and the conventional method of Inter-Library Lending (ILL) is obsoleting as peer-to-peer resource sharing, and e-document delivery have come to the stage. Development of academic Social networks such as Research Gate, Academia Edu., and many other networks facilitate resource sharing and minimise the turnaround time of traditional ILL and document delivery. Digitalisation has supported to shift of manual archives to digital archives/ and Institutional repositories.

Overall, developing a smart library system will support ensure facing any type of changes.

What is a smart library?

Definition and description of smart libraries have been given from different perspectives in the reviewed literature. Smartness indicates that "Libraries should be capable of automatically capturing the needs of users and providing the resources and services to meet those needs", (Cao, Liang & Li, 2018). Smart libraries use new technologies to improve their services. For instance, a single search engine that is a one-stop reader service, Radio Frequency Identification (RFID), Internet of Things, Artificial Intelligence, Library robot, etc.

The main target of smart libraries is providing better services. Smart Libraries consider a multidimensional approach. These are the technical, service, and patron (user-oriented) dimensions. Much literature on smart Libraries considers one of the above perspectives, and the multidimensional aspects are rarely discussed.

Cao, Liang and Li (2018) indicated as "traditional libraries can transform to smart libraries by strategic design and implementation of advanced technologies, such as cloud computing, data mining and artificial intelligence, but they also need to consider service building, user cultivation and librarian training".

Smart libraries are derived from digital libraries, intelligent libraries, hybrid libraries, blended library ubiquitous libraries and mobile library components. The digital library stresses the application of digital technology; the intelligent library concentrates on bringing intelligence to a library's functions and services; the blended library and ubiquitous library highlight the importance of ubiquitous

service, and the mobile library puts user-centric service first.

So, the basic ideas and main components of the smart library concept are as follows.

a. Technical dimension: Smart technology that includes the Internet of Things (IoT), data mining and Artificial Intelligence (AI).
b. Service dimension: Smart Service is user centred service and
c. Patron dimension: Smart people who are the librarians and users.

Smart technology components such as IoT, data mining, and AI have long been discussed in Library & Information Management and system literature, conferences and many other media. Most librarians are familiar with conceptualising and applying these technologies within our library system as much as possible. Datamining technology is used in many universities to mine library data to correlate with students' academic performance, to provide selective dissemination of information services, significantly individualised services, and to develop collections based on recommended user needs.

Using AI in a smart library can enhance the content of intelligent analysis capabilities and improve the effectiveness of services. For instance, specific types of neural networks are used in libraries to sense and visualise images and voices and to create intelligent robots. University of Chicago Mansotto library used smart technology to create a robot in the underground Library Management system. They have stored around 3.5 million volumes in one-seventh of the space required by conventional bookshelves. Robots help to bring books that are requested by the system librarian. This is a wonderful experience for me when I visit this library in 2017.

The following essential component of the technology dimension of the smart library is the application of IoT. Vermesan et al. (2011) defined IoT as a "dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual 'things' have identities, physical attributes, virtual personalities, use intelligent interfaces, and are seamlessly integrated into the information network". Librarians apply IoT in most of the areas of a dynamic library. It is used to develop a user and information profile, give access to conventional and e-resources, and many other purposes such as sharing information, communicating, training, consultation and information retrieval. A smart library with RFID devices, infrared sensors, GPS, laser scanners, and so forth can be fully integrated and realised anywhere and at any time, and it can achieve automatic positioning of documents, automatic inventories, unattended

security management and self-borrowing, among other services, (Cao, Liang & Li, 2018).

The three types mentioned above of technologies are independent of each other. Strategic directions that comply with multiple dimensions are essential to developing smartness. For example, a conventional library, digital library, intelligent library and blended library could be transformed into a smart library by designing strategies and implementing advanced technologies such as data mining, AI & IoT to promote services.

Conclusions and recommendations

As we know, social, economic and mainly technological forces may affect library services. Most academic librarians are receptive to changes and anticipate changes, even though a few of them are resistant to change. Those who are receptive update their knowledge and skills to face the changes. They analyze the current trends and future direction of libraries with a view to formulate, implement, and develop plans for continuous growth. Libraries require a methodical approach to managing change to ensure efficiency and effectiveness. This approach recommends that librarians anticipate changes using alignment, accountability, agility, accessibility, and assessment principles. (Knight 2017). Librarians should conceptualize the 'smart library' concept for the development and innovations of libraries. Librarians of Sri Lanka from universities, special or public libraries may consider at least one of these dimensions as we are amidst of economic/political crisis and facing financial shortfalls.

Libraries of today should unite across international borders and work towards common goals. Collaborating with international libraries and obtaining consultancy services is essential, if necessary. Such librarians will be 'change champions.

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